

Section I. (The Claims)

1. (Currently Amended) A cleaning composition ~~comprising including~~ a quaternary base, at least one alkali or alkaline earth base, and at least one additional component selected from the group consisting of a chelator, an oxirane species, and combinations thereof, wherein said chelator comprises a species selected from the group consisting of: 1-amino-1,2,4-triazole; 1-amino-1,2,3-triazole; 1-amino-5-methyl-1,2,3-triazole; 3-mercapto-1,2,4-triazole; 3-isopropyl-1,2,4-triazole; naphthotriazole; 2-mercaptobenzimidazole; 5-aminotetrazole; 5-amino-1,3,4-thiadiazole-2-thiol; 2,4-diamino-6-methyl-1,3,5-triazine; ~~thiazole~~; triazine; methyltetrazole; 1,3-dimethyl-2-imidazolidinone; 1,5-pentamethylenetetrazole; 1-phenyl-5-mercaptotetrazole; diaminomethyltriazine; imidazoline thione; 4-methyl-4H-1,2,4-triazole-3-thiol; 5-amino-1,3,4-thiadiazole-2-thiol; tritoyl phosphate; indiazole; adenine; salicylamide; iminodiacetic acid; benzoguanamine; thiocyanuric acid; anthranilic acid; 3-mercaptopropanol; and combinations thereof, and wherein the oxirane species comprises a species selected from the group consisting of: oxirane, methyl-, polymer with oxirane, ether with 2,2'-(oxidoimino)bis(ethanol) (2:1), N-(3(C9-11-isoalkyloxy)propyl)derivatives, C₁₀-rich; and oxirane, methyl-, polymer with oxirane, mono(octylphenyl)ether; ~~and said cleaning composition is useful for removing photoresist and/or sacrificial anti-reflective coating (SARC) materials from a substrate having such material(s) thereon.~~

2. (Original) The cleaning composition of claim 1, which is devoid of hydroxylamine therein.
3. (Cancelled)
4. (Previously Presented) The cleaning composition of claim 1, comprising the following components:
- 0.1 - 40.0 weight % organic quaternary base;
 - 0.01-5 weight % alkali or alkaline earth base;
 - 0-80 weight % solvent(s) and/or amine(s);
 - 0-5 weight % surfactant;
 - 0 - 10 weight % chelator/passivation agent; and
 - 0 - 98 weight % water,

wherein percentages of the components are percentages by weight, based on total weight of the composition, and wherein the total of the weight percentages of such components of the composition does not exceed 100 weight %.

5. (Previously Presented) The cleaning composition of claim 1, including at least one additional ingredient selected from the group consisting of stabilizers, dispersants, anti-oxidants, fillers, penetration agents, adjuvants, additives, and excipients.

6. (Previously Presented) The cleaning composition of claim 1, comprising the following components:

- 2-15 weight % organic quaternary base;
- ~0.01-2 weight % alkali or alkaline earth base;
- 0-50 weight % solvent(s) and/or amine(s);
- ~0.01-2 weight % surfactant;
- 0 – 5 weight % chelator/passivation agent; and
- 40 – 95 weight % water,

wherein percentages of the components are percentages by weight, based on total weight of the composition, and wherein the total of the weight percentages of such components of the composition does not exceed 100 weight %.

7. (Currently Amended) The cleaning composition of claim 1, selected from the group consisting of Formulations A-C², wherein all percentages are by weight, based on the total weight of the formulation:

Formulation A

5.36% benzyltrimethylammonium hydroxide
0.28% potassium hydroxide
3.0% 4-methylmorpholine N-oxide
0.30% polyoxyethylene(150) dinonylphenyl ether
0.08% 2-mercaptobenzimidazole
91.0% water

Formulation B

5.36% benzyltrimethylammonium hydroxide
0.28% potassium hydroxide
3.0% 4-methylmorpholine N-oxide
0.30% polyoxyethylene(150) dinonylphenyl ether
0.20% 5-amino-1,3,4-thiadiazole-2-thiol
90.86% water

Formulation C

3.60% benzyltrimethylammonium hydroxide
 0.27% potassium hydroxide
 3.5% 4-methylmorpholine N-oxide
 15.0% 4-(3-aminopropyl)morpholine
 0.30% polyoxyethylene (150) dinonylphenyl ether
 0.08% 2-mercaptobenzimidazole
 77.25% water

Formulation D

5.36% benzyltrimethylammonium hydroxide
 0.28% potassium hydroxide
 20.0% dimethyl sulfoxide
 0.08% 2-mercaptobenzimidazole
 74.28% water

Formulation E

5.36% benzyltrimethylammonium hydroxide
 0.28% potassium hydroxide
 10.0% tetramethylene sulfone
 0.30% oxirane, methyl-, polymer with oxirane, ether with 2,2'-(oxidoimino)bis(ethanol) (2:1), N-(3(C9-11-isoalkyloxy)propyl)derivatives, C₁₀-rich
 0.08% 2-mercaptobenzimidazole
 83.98% water

Formulation F

5.36% benzyltrimethylammonium hydroxide
 0.28% potassium hydroxide
 10.0% di(ethyleneglycol)butyl ether
 10.0% 2-(2-dimethylamino)ethoxyethanol
 0.30% oxirane, methyl-, polymer with oxirane, ether with 2,2'-(oxidoimino)bis(ethanol) (2:1), N-(3(C9-11-isoalkyloxy)propyl)derivatives, C₁₀-rich
 74.06% water

Formulation G

5.36% benzyltrimethylammonium hydroxide
 0.28% potassium hydroxide
 10.0% tetramethylene sulfone
 10.0% di(ethyleneglycol)butyl ether
 0.10% oxirane, methyl-, polymer with oxirane, mono(octylphenyl)ether
 0.08% 2-mercaptobenzimidazole
 74.18% water,

Formulation H

benzyltrimethylammonium hydroxide, 40% aqueous solution	9.0 %
potassium hydroxide, 45% aqueous solution	0.6 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %

dinonylphenol ethoxylate, 7% aqueous solution	4.3 %
2-mercaptobenzimidazole	0.1 %
aminopropylmorpholine	20.0 %
water	59.02 %

Formulation I

benzyltrimethylammonium hydroxide, 40% aqueous solution	9.0 %
potassium hydroxide, 45% aqueous solution	0.6 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
dinonylphenol ethoxylate, 7% aqueous solution	4.3 %
2-mercaptobenzimidazole	0.1 %
aminopropylmorpholine	15.0 %
water	64.02 %

Formulation J

benzyltrimethylammonium hydroxide, 40% aqueous solution	9.0 %
potassium hydroxide, 45% aqueous solution	0.6 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
dinonylphenol ethoxylate, 7% aqueous solution	4.3 %
2-mercaptobenzimidazole	0.1 %
aminopropylmorpholine	10.0 %
water	69.02 %

Formulation K

benzyltrimethylammonium hydroxide, 40% aqueous solution	13.4 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	78.62 %

Formulation L

benzyltrimethylammonium hydroxide, 40% aqueous solution	13.4 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	1.2 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	78.02 %

Formulation M

tetramethylammonium hydroxide, 25% aqueous solution	5.85 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	1.2 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	85.57 %

Formulation N

tetramethylammonium hydroxide, 25% aqueous solution	2.93 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	1.2 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	88.49 %

Formulation O

benzyltrimethylammonium hydroxide, 40% aqueous solution	7.2 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	84.82 %

Formulation P

benzyltrimethylammonium hydroxide, 40% aqueous solution	3.6 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	1.2 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	87.82 %

Formulation Q

benzyltrimethylammonium hydroxide, 40% aqueous solution	3.6 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	88.42 %

Formulation R

benzyltrimethylammonium hydroxide, 40% aqueous solution	7.2 %
N-methylmorpholine oxide, 50% aqueous solution	7.0 %
KOH, 45% aqueous solution	0.3 %
2-mercaptobenzimidazole	0.08 %
dinonylphenol polyoxyethylene	0.3 %
water	85.12 %

Formulation S

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %

methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
3-amino-5-mercapto-1,2,4-triazole	1.0 %
water	72.04 %

Formulation T

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
4-methyl-2-phenyl-imidazole	1.0 %
water	72.04 %

Formulation U

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
2-mercaptothiazoline	1.0 %
water	72.04 %

Formulation V

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
8-hydroxyquinoline	1.0 %
water	72.04 %

Formulation W

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
1-phenyl-2-tetrazoline-5-thione	1.0 %
water	72.04 %

Formulation X

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
gallic acid	1.0 %

water	72.04 %
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Formulation Y

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
salicylic acid	1.0 %
water	72.04 %

Formulation Z

benzyltrimethylammonium hydroxide, 40% aqueous solution	22.26 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
methyldiethanolamine	2.33 %
phosphoric acid (86 %)	1.69 %
ascorbic acid	1.0 %
water	72.04 %

Formulation A²

benzyltrimethylammonium hydroxide, 40% aqueous solution	7.2 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
aminopropyl morpholine	10 %
4-methyl-2-phenyl-imidazole	1.0 %
water	81.12 %

Formulation B²

benzyltrimethylammonium hydroxide, 40% aqueous solution	7.2 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
aminopropyl morpholine	10 %
4-methyl-2-phenyl-imidazole	0.5 %
water	81.62 %

Formulation C²

benzyltrimethylammonium hydroxide, 40% aqueous solution	7.2 %
Potassium hydroxide, 45% aqueous solution	0.6 %
2-mercaptobenzimidazole	0.08 %
aminopropyl morpholine	10 %
4-methyl-2-phenyl-imidazole	1.0 %
water	81.02 %
dinonylphenol polyoxyethylene	0.1 %

wherein said cleaning composition is useful for removing photoresist and/or sacrificial anti-reflective coating (SARC) materials from a substrate having such material(s) thereon.

8. (Cancelled)
9. (Cancelled)
10. (Previously Presented) The cleaning composition of claim 1, wherein the alkali base comprises potassium hydroxide.
- 11.-13. (Cancelled)
14. (Previously Presented) The cleaning composition of claim 1, wherein the chelator comprises 2-mercaptobenzimidazole.
15. (Previously Presented) The cleaning composition of claim 1, wherein the chelator is present in an amount greater than about 0.08 wt.%, based on the total weight of the composition.
16. (Cancelled)
17. (Previously Presented) The composition of claim 1, further comprising a surfactant.
18. (Original) The composition of claim 17, wherein the surfactant comprises a surfactant species selected from the group consisting of: fluoroalkyl surfactants; polyethylene glycols; polypropylene glycols; polyethylene glycol ethers; polypropylene glycol ethers; carboxylic acid salts; dodecylbenzenesulfonic acid and salts thereof; polyacrylate polymers; dinonylphenyl polyoxyethylene; silicone polymers; modified silicone polymers; acetylenic diols; modified acetylenic diols, alkylammonium salts; modified alkylammonium salts; and combinations of two or more of the foregoing.
19. (Previously Presented) The composition of claim 1, further comprising a co-solvent.
20. (Original) The composition of claim 19, wherein the co-solvent comprises a co-solvent species selected from the group consisting of: amines; glycols; glycol ethers; polyglycol ethers; and combinations of two or more of the foregoing.

21. (Original) The composition of claim 19, wherein the co-solvent comprises a co-solvent species selected from the group consisting of: dimethyldiglycolamine; 1,8-diazabicyclo[5.4.0]undecene; aminopropylmorpholine; triethanolamine; methylethanolamine; diethylene glycol; propylene glycol; neopentyl glycol; hydroxyethylmorpholine; aminopropylmorpholine; di(ethylene glycol)monoethyl ether; di(propylene glycol)propyl ether; ethylene glycol phenyl ether; di(propylene glycol) butyl ether; butyl carbitol; polyglycol ethers; and combinations of two or more of the foregoing.
22. (Cancelled)
23. (Cancelled)
24. (Withdrawn) A method of removing photoresist and/or SARC material from a substrate having said material thereon, said method comprising contacting the substrate with a cleaning composition for sufficient time to at least partially remove said material from the substrate, wherein the cleaning composition comprises ~~includes~~ a quaternary base, at least one alkali or alkaline earth base, and at least one additional component selected from the group consisting of a chelator, an oxirane species, and combinations thereof, wherein said chelator comprises a species selected from the group consisting of: 1-amino-1,2,4-triazole; 1-amino-1,2,3-triazole; 1-amino-5-methyl-1,2,3-triazole; 3-mercapto-1,2,4-triazole; 3-isopropyl-1,2,4-triazole; naphthotriazole; 2-mercaptobenzimidazole; 5-aminotetrazole; 5-amino-1,3,4-thiadiazole-2-thiol; 2,4-diamino-6-methyl-1,3,5-triazine; ~~thiazole~~; triazine; methyltetrazole; 1,3-dimethyl-2-imidazolidinone; 1,5-pentamethylenetetrazole; 1-phenyl-5-mercaptotetrazole; diaminomethyltriazine; imidazoline thione; 4-methyl-4H-1,2,4-triazole-3-thiol; 5-amino-1,3,4-thiadiazole-2-thiol; tritoyl phosphate; indiazole; adenine; salicylamide; iminodiacetic acid; benzoguanamine; thiocyanuric acid; anthranilic acid; 3-mercaptopropanol; and combinations thereof, and wherein the oxirane species comprises a species selected from the group consisting of: oxirane, methyl-, polymer with oxirane, ether with 2,2'-(oxidoimino)bis(ethanol) (2:1), N-(3(C9-11-isoalkyloxy)propyl)derivatives, C₁₀-rich; and oxirane, methyl-, polymer with oxirane, mono(octylphenyl)ether.
25. (Withdrawn) The method of claim 24, wherein the substrate comprises a semiconductor device structure.
26. (Withdrawn) The method of claim 24, wherein the material comprises photoresist.

27. (Withdrawn) The method of claim 24, wherein the material comprises SARC material.
28. (Withdrawn) The method of claim 27, wherein the SARC material has been applied to a semiconductor device structure to minimize reflectivity variations during photolithographic patterning on the semiconductor device structure.
29. (Withdrawn) The method of claim 24, wherein said contacting is carried out for a time of from about 10 to about 45 minutes.
30. (Withdrawn) The method of claim 24, wherein said contacting is carried out at temperature in a range of from about 50°C to about 80°C.
31. (Withdrawn) The method of claim 24, wherein the composition is devoid of hydroxylamine therein.
32. (Cancelled)
33. (Withdrawn) The method of claim 24, wherein the composition comprises the following components:
- 0.1 - 40.0 weight % organic quaternary base;
 - 0.01-5 weight % alkali or alkaline earth base;
 - 0-80 weight % solvent(s) and/or amine(s);
 - 0-5 weight % surfactant;
 - 0 - 10 weight % chelator/passivation agent; and
 - 0 - 98 weight % water,
- wherein percentages of the components are percentages by weight, based on total weight of the composition, and wherein the total of the weight percentages of such components of the composition does not exceed 100 weight %.
34. (Withdrawn) The method of claim 24, wherein the composition includes at least one additional ingredient selected from the group consisting of stabilizers, dispersants, anti-oxidants, fillers, penetration agents, adjuvants, additives, fillers, and excipients.
35. (Withdrawn) The method of claim 24, wherein the composition comprises the following

components:

- 2-15 weight % organic quaternary base;
- ~0.01-2 weight % alkali or alkaline earth base;
- 0-50 weight % solvent(s) and/or amine(s);
- ~0.01-2 weight % surfactant;
- 0 – 5 weight % chelator/passivation agent; and
- 40 – 95 weight % water,

wherein percentages of the components are percentages by weight, based on total weight of the composition, and wherein the total of the weight percentages of such components of the composition does not exceed 100 weight %.

36. (Cancelled).

37. (Cancelled)

38. (Cancelled)

39. (Withdrawn) The method of claim 24, wherein the alkali base comprises potassium hydroxide.

40.-42. (Cancelled)

43. (Withdrawn) The method of claim 24, wherein the chelator comprises 2-mercaptobenzimidazole.

44. (Withdrawn) The method of claim 43, wherein the chelator is present in an amount greater than about 0.08 wt.%, based on the total weight of the composition.

45. (Withdrawn) The method of claim 24, wherein the quaternary base comprises benzyltrimethylammonium hydroxide.

46. (Withdrawn) The method of claim 24, wherein the cleaning composition further comprises a surfactant.

47. (Withdrawn) The method of claim 46, wherein the surfactant comprises a surfactant species

selected from the group consisting of: fluoroalkyl surfactants; polyethylene glycols; polypropylene glycols; polyethylene glycol ethers; polypropylene glycol ethers; carboxylic acid salts; dodecylbenzenesulfonic acid and salts thereof; polyacrylate polymers; dinonylphenyl polyoxyethylene; silicone polymers; modified silicone polymers; acetylenic diols; modified acetylenic diols, alkylammonium salts; modified alkylammonium salts; and combinations of two or more of the foregoing.

48. (Withdrawn) The method of claim 24, wherein the cleaning composition further comprises a co-solvent.

49. (Withdrawn) The method of claim 48, wherein the co-solvent comprises a co-solvent species selected from the group consisting of: amines; glycols; glycol ethers; polyglycol ethers; and combinations of two or more of the foregoing.

50. (Withdrawn) The method of claim 48, wherein the co-solvent comprises a co-solvent species selected from the group consisting of: dimethyldiglycolamine; 1,8-diazabicyclo[5.4.0]undecene; aminopropylmorpholine; triethanolamine; methylethanolamine; diethylene glycol; propylene glycol; neopentyl glycol; hydroxyethylmorpholine; aminopropylmorpholine; di(ethylene glycol)monoethyl ether; di(propylene glycol)propyl ether; ethylene glycol phenyl ether; di(propylene glycol) butyl ether; butyl carbitol; polyglycol ethers; and combinations of two or more of the foregoing.

51. (Cancelled)

52. (Cancelled)

53. (Previously Presented) The cleaning composition of claim 1, wherein the quaternary base comprises an organic quaternary ammonium base.

54. (Previously Presented) The cleaning composition of claim 1, wherein the quaternary base comprises benzyltrimethylammonium hydroxide.

55. (Previously Presented) The cleaning composition of claim 1, wherein the cleaning composition comprises benzyltrimethylammonium hydroxide and potassium hydroxide.

56. (Previously Presented) The cleaning composition of claim 19, wherein the co-solvent

comprises a glycol ether.

57. (Previously Presented) The cleaning composition of claim 1 comprising benzyltrimethylammonium hydroxide; potassium hydroxide; tetramethylene sulfone; di(ethyleneglycol)butyl ether; oxirane, methyl-, polymer with oxirane, mono(octylphenyl)ether; 2-mercaptobenzimidazole; and water.

58. (Withdrawn) A method of making a semiconductor device comprising contacting the substrate with the cleaning composition of claim 1 for sufficient time to at least partially remove said material from the substrate.

59. (Previously Presented) The cleaning composition of claim 1, further comprising oxidant.